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WARZYN

PROJECT
1526800-184

PLANNING DOCUMENTS
VOLUME I OF III
WORK PLAN
FINAL

REMEDIAL INVESTIGATION/FEASIBILITY STUDY

BELOIT CORPORATION
ROCKTON FACILITY
ROCKTON, ILLINOIS

JUNE 1992

PREPARED FOR:
BELOIT CORPORATION
A HARNISCHFEGER INDUSTRIES COMPANY
BELOIT, WISCONSIN

...

PREPARED BY:
WARZYN INC.
MADISON, WISCONSIN

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Project Manager

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TABLE OF CONTENTS

8

9

10

11

LIST OF TABLES

LIST OF FIGURES

LIST OF DRAWINGS

LIST OF APPENDICES

[vlr-601-46z]

1

INTRODUCTION

1.1 BACKGROUND

This Work Plan describes the activities proposed for the performance of the Remedial Investigation (RI) and Feasibility Study (FS) at the Beloit Corporation Blackhawk Facility (site) located near Rockton, Illinois. The Work Plan was prepared in response to the Consent Decree and Statement of Work (SOW) issued by the Illinois Environmental Protection Agency (IEPA) to the Respondents which include Beloit Corporation, Safe-T-Way Manufacturing, and Soterion/United Recovery, Inc. However, Beloit Corporation is the only potentially responsible party (PRP) to enter into the Consent Decree.

1.2 SITE DEFINITION

The site is located near the Village of Rockton, in Winnebago County, Illinois, in Section 13 and the southeast quadrant of Section 12, Township 46 North, Range 1 East. As defined by the IEPA in the SOW and displayed on Drawing 15268-7, the site is bordered to the west by the Rock River; to the north by Prairie Hill Road; to the east by Blackhawk Blvd.; and to the south by a line projected from Blackhawk Blvd. to the Rock River along an east-west access road that lies between Blackhawk Blvd. and the Rock River.

1.3 SCOPE

The RI and FS are interrelated, and as such, the appropriate data will be collected during the RI to develop remedial alternatives for the FS. The need for treatability studies will be assessed during the course of this investigative process.

Several previous studies have been performed at the site and the surrounding area in attempts to locate (a) source(s) of groundwater contamination in the area. A summary of these investigations is presented in the Site Evaluation Report. The conceptual approach to the RI is based on the previous studies performed at the site and the Consent Decree. This approach is consistent with the National Contingency Plan (NCP), the Superfund process, and applicable guidance outlined in the Consent Decree. As the remedial investigation proceeds and data becomes available, the current concept of the site may need to be modified and alternative investigative approaches may be warranted. The IEPA will have the

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INTRODUCTION

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becomes available, the current concept of the site may need to be modified and alternative investigative approaches may be warranted. The IEPA will have the opportunity to comment on the RI Report including the information taken from the SER and entered into the RI Report.

Based on previous investigations, several potential sources of groundwater contamination have been identified. These include the foundry sand disposal area, sludge spreading area, old (abandoned) wastewater lagoons, storage yard, manufacturing plant perimeter, Rockton Excavating and the former Soterion Oil property (refer to Drawing 15268-6). In addition, the IEPA has identified the R&D facility and areas identified as potential impoundments on aerial photos (U.S. EPA, 1990).

Previous investigations indicate a north-northeast to south-southwest groundwater flow direction at the site. Previous investigations conducted by Beloit Corporation have suggested that potential contaminant sources on the Beloit Corporation property may contribute to groundwater contamination observed south of the property, but no apparent migration route has been identified for contamination on the Beloit Corporation property to affect wells in the Blackhawk Acres Subdivision. The proposed scope of work will investigate the area outlined in the Consent Decree (see Drawing 15268-6) including the Beloit Corporation property, the Blackhawk Acres Subdivision, and the potential for lateral contaminant transport between the two areas. Suspected sources of contamination at the site as identified above will be investigated for potential lateral and vertical transport. Additional sources on and off the site will be sought in the RI.

The Work Plan focuses on the identified key issues involving contamination at the site and the tasks which are necessary to resolve those issues. The key issues identified include:

- The potential impact on private water supply wells within the site boundaries;
- The potential contribution of multiple potential sources of contamination in the area;
- The potential for remedying the site in units (discrete locations) or on a site-wide basis; and
- The potential for ecological effects due to site-related contaminants or potential remedial activities.

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2

TASK 0
WORK PLAN PREPARATION

2.1 WORK SCOPE

The RI/FS Work Plan has been developed in conformance with the Consent Decree, and standards as set forth in the following statutes, regulations and guidance:

- Section 121 of CERCLA;
- U.S. EPA "Guidance for Conducting Remedial Investigations and Feasibility Studies Under CERCLA", EPA/540/G-89/004;
- Illinois Department of Public Health "Illinois Water Well Construction Code", dated 1989; and
- National Contingency Plan (NCP), dated March 8, 1990, as amended.

The schedule displayed in Figure 1 shows the implementation of tasks and submission of deliverables in months subsequent to regulatory approval and acceptance of prior deliverables. The IEPA document review period will be 45 calendar days to commence on receipt of such document(s). The IEPA may extend the time for document review by notifying Beloit Corporation of such extension within 30 days of receipt of the document(s). Subsequent to analysis and review of the data collected during Phase 1 of this RI/FS, schedule revisions may be necessary.

The planning documents are contained in three volumes. The Work Plan is Volume I. The Health and Safety Plan and QAPP are contained in Volumes II and III, respectively, with the Field Sampling Plan contained in Appendix A of the QAPP.

2.2 HEALTH AND SAFETY PLAN

The Health and Safety Plan (HSP) has been prepared to address hazards that the investigation activities may present to the investigation team and to the surrounding community. The plan conforms to applicable regulatory requirements and guidance, including:

- Section III (c) of CERCLA;
- "Occupational Safety and Health Standards for Hazardous Waste Operations and Emergency Response" [29 CFR 1910.120 (I)(2)], Interim Rule, December 19, 1986;
- U.S. EPA Order 1440.3 - "Respiratory Protection";
- U.S. EPA Order 1440.2 - "Health and Safety Requirements for Employees Engaged in Field Activities";
- U.S. EPA Occupational Health and Safety Manual;
- U.S. EPA Interim Standard Operating Safety Procedures; and
- Site Conditions.

The HSP details personnel responsibilities, protective equipment, procedures and protocols, decontamination, training, and medical surveillance. The plan identifies existing and potential hazards, and problems that could be encountered and their anticipated solutions. Provisions for protecting third parties, such as visitors or the surrounding community, are also provided. The HSP is found in Volume II.

2.3 BASELINE RISK ASSESSMENT PLAN

A Baseline Risk Assessment Plan to evaluate the actual or potential threat to public health, welfare and/or environment presented by the "no-action" alternative will be developed and completed by the IEPA. Actual or potential risks will be quantified whenever possible. The Baseline Risk Assessment will be conducted in accordance with the procedures described in:

- The National Contingency Plan (NCP), dated March 8, 1990, as amended;

- U.S. EPA's RI/FS Guidance: "Interim Final Risk Assessment Guidance (RAG) for Superfund, Volume I, Human Health Evaluation Manual" (Part A) (EPA/540/1-89/002) (December 1989);

- "Interim Final Risk Assessment Guidance for Superfund, Volume II, Environmental Evaluation Manual" (EPA/540/1-89/001) (March 1989);

- U.S. EPA's Integrated Risk Information System (IRIS), as well as updates to these documents, data bases, or additional RAG volumes; and

- U.S. EPA "Region V Scope of Work for Ecological Assessment", undated, unpublished document, attached to a U.S. EPA Region V internal memorandum on "Ecological Assessments" by David Ulrich, Waste Management Division, April 30, 1991.

The Baseline Risk Assessment will be completed independent of health assessments conducted or to be conducted by the IEPA for the Agency for Toxic Substances and Disease Registry (ATSDR) pursuant to the Superfund Amendments and Reauthorization Act of 1986 (SARA). The IEPA will prepare the Baseline Risk Assessment including the Ecological Assessment. Copies of draft work plans and support documents will be provided for ATSDR review if requested by the IEPA. If an ATSDR health assessment is completed, the results will be addressed in the Baseline Risk Assessment.

2.4 DATA MANAGEMENT PLAN

A Data Management Plan (DMP) has been developed to document and track investigation data and results. This plan identifies and establishes laboratory and data documentation materials and procedures, project file requirements, and project-related progress and financial reporting procedures and documents. The Data Management Plan is presented in Appendix A of the Work Plan.

2.5 QAPP AND FIELD SAMPLING AND ANALYSIS PLAN

A Field Sampling Plan (FSP) has been prepared in order that sample collection and analytical activities are conducted in accordance with technically acceptable protocols. The FSP is Appendix A of the QAPP. The QAPP and the FSP are contained in Volume III of the planning documents.

The FSP addresses data acquisition activities for the RI and contains:

- a description of the activities and additional data required to adequately characterize the site, evaluate the no-action alternative, and support the FS;

- a statement of sampling objectives;

- specification of equipment, analytical procedures of interest, sample types, and sample locations and frequency; and

- a sampling and analysis schedule compatible with mutually agreeable target dates for the project.

In addition, the FSP preliminarily considers potential remedial technologies and associated data that may be required to evaluate alternatives for the FS. The FSP describes the methods for source characterization and migration pathway assessment including; geophysical evaluation, soil gas sampling, soil borings and soil sampling, monitoring well installations, determination of groundwater levels, hydraulic conductivity tests, and groundwater sampling.

The QAPP has been prepared in accordance with current U.S. EPA and State guidance. The QAPP specifies the analytical methods and protocols to be used at the various stages of the site investigation. Specific methods are defined for the field screening of soil gas and groundwater, soils, air quality, contaminant characterization, and bench/pilot treatability testing. Quality assurance/quality control (QA/QC) criteria are specified and applications and limitations of such criteria are discussed.

2.6 ATSDR HEALTH ASSESSMENT

The findings and conclusions of the Health Assessment, which has already been prepared by the Illinois Department of Public Health for ATSDR will be addressed in the RI report.

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3

TASK 1
SITE EVALUATION REPORT

Existing data have been reviewed to develop a preliminary evaluation of site conditions. A description of the results of this evaluation is contained in the Site Evaluation Report (SER, 1990). The information in the SER was used to develop the conceptual site model, and to identify informational needs which will be addressed during the RI. The IEPA will have the opportunity to comment on the RI Report including the information taken from the SER and entered into the RI Report.

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4

REMEDIAL INVESTIGATION

The objectives of the RI are to:

- Identify potential site source(s), and determine the characteristics and extent of soil and groundwater contamination at the site;
- Determine the pathways of contaminant migration and evaluate the potential for impacts on and off site;
- Determine the physical features that could affect contaminant migration, containment, or remediation;
- Characterize and quantify risks to public health and the environment; and
- Gather information necessary to support the Feasibility Study.

The RI will consist of the following activities:

- Description of the current situation (as represented by information in the SER) and monitoring well inspection (Task 1 in the Statement of Work (SOW));
- Site investigation (Task 2 in the SOW), this investigation will include observation and assessment of ecological features of the site;
- Site investigation analysis (Task 3 in the SOW);
- Laboratory and bench scale studies, if necessary (Task 4 in the SOW);
- Community relations support (Task 5 in the SOW); and
- Reports (Task 6 in the SOW).

Descriptions of each of these activities are presented in the following sections. These activities will be performed in a phased approach as recommended in Section 1.4.2 of the U.S. EPA "Guidance for Conducting Remedial Investigations and Feasibility Studies under CERCLA" (EPA/540/G-89/004). The phased

approach allows for the data collected during the RI to influence the development and evaluation of remedial alternatives in the FS, which in turn affects the data needs and the scope of potential treatability studies. Certain FS activities may be conducted during the initial stages of the RI and will be revised as appropriate during the RI/FS. These include:

- The refinement and documentation of remedial action objectives and alternatives;
- Development of general remedial actions;
- Assessment of the need for treatability studies; and
- Preliminary identification of Applicable or Relevant and Appropriate Requirements (ARARs).

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5

TASK 2
RI SITE INVESTIGATION

Site investigation activities will consist of:

- Site mapping;
- Evaluation of existing monitoring wells;
- Abandonment of standpipes and monitoring wells;
- Source characterization;
- Migration pathway assessment;
- Contaminant characterization; and
- Characterization of public health and environmental risk.

Initial field investigation activities will be conducted to collect data for source characterization, assessment of migration pathways, and contaminant characterization. Based on the information obtained from these field investigation activities, an analysis of additional data needs will be made. If necessary, investigative activities will be implemented to further determine the nature and extent of contamination at the site.

Potential modifications to the number and placement of soil gas samples, soil borings, monitoring wells, and the vertical position of monitoring well screens may be required based on field observations and analytical results of the soil gas and groundwater quality survey. Results of the on site lab analyses of soil gas and groundwater will be provided to the IEPA oversight personnel, the same day the sample is analyzed. IEPA input to field modifications will be sought, but not required before implementation. The project hydrogeologist will notify the IEPA personnel in a timely manner of any modifications with an explanation for the change. Beloit Corporation and/or its contractor will consult with the IEPA Project Manager should modifications to the Work Plan be necessary.

A source characterization investigation will be conducted to characterize the physical and chemical nature of the waste materials and affected media present at the site. This will consist of locating potential sources of contamination (including off site sources which could potentially affect on site conditions), and physically and chemically characterize the sources.

Contaminant migration pathways (groundwater, surface water, soils, and sediment) will be assessed concurrent with and subsequent to (it is often necessary to back track along a contaminant plume (migration pathway) in order to locate potential source areas) source characterization activities. The objective of the migration pathway assessment is to characterize the physical migration pathways through which contaminants may or may not have moved. Screening of contaminants within probable migration routes will be conducted during the migration pathway assessment to help locate these routes and to place monitoring points at appropriate locations. The air pathway will be monitored during site investigative activities for protection of health and safety.

The objective of contaminant characterization is to evaluate the extent and magnitude of contaminant migration along pathways of concern at the site. This phase will utilize CLP analyses with data quality objectives appropriate for the characterization of the site, and evaluation of the remedial alternatives. A summary of proposed investigation activities is presented in Table 1.

Data generated during Phase 1 of the Site Investigation will be analyzed and presented in Technical Memorandum No. 1. This technical memorandum will describe the contaminants of concern, source(s) of these contaminants, and how these contaminants could migrate within and/or away from the site. In addition, Technical Memorandum No. 1 will evaluate the extent and magnitude of contaminant migration along pathways of concern at the site. Based on this information, a data sufficiency analysis will be performed, and if necessary, recommendations will be made to address additional data needs and subsequent investigative activities (i.e., a second RI phase, which may include further sampling rounds).

5.1 SITE MAP/MONITORING WELL EVALUATION AND ABANDONMENT

5.1.1 Site Map

A topographic map with a scale of 1 in. to 200 ft and a contour interval of 2 ft has been prepared. This map will be used to prepare other drawings and maps showing RI data.

5.1.2 Location and Elevation Survey of Existing Features

A location and elevation survey of existing monitoring wells, standpipes, features, and staff gauges (if necessary) will be performed to provide horizontal and vertical ground control. Horizontal locations will be to the closest 0.1 ft and tied to the Illinois State Plane Coordinate Grid system. Elevations will be relative to the National Geodetic Vertical Datum of 1929. Elevations of ground surface will be to the nearest 0.1 ft. Top of protective casing and top of well casing will be to

the nearest 0.01 ft. In addition to the topographic map, a site base map will be prepared at a scale of 1 in. to 200 ft. This base map will show the location of new and existing monitoring wells and standpipes. Subsequent survey work will be required to document sampling locations, new monitoring well and boring locations, and new staff gauge locations.

5.1.3 Existing Monitoring Well Evaluation/Monitoring Well and Standpipe Abandonment

An inventory and evaluation of existing monitoring wells will be performed to assess their condition. This will include IEPA and Beloit Corporation wells. Wells determined by Beloit and the IEPA to be in good condition may be used in the subsequent RI investigation. Section 3.2.1.1 of the FSP (Appendix A of the QAPP) presents a description of the criteria to be used in evaluating each existing well.

Natural gamma ray logging will be conducted in the functional existing wells for use in evaluating subsurface stratigraphic conditions.

Warzyn's soil description (created from split spoon samples and grain size analyses) for monitoring well MW18 does not show the presence of a fine-grained confining unit other than shallow seams which in these subsurface conditions are not unexpected. If the borehole geophysical log and borehole soil log indicate that a confining unit does exist and, if it can be shown that the filter pack is allowing contaminants to migrate past this confining layer, then Beloit Corporation will abandon this well.

5.1.4 Access and Support Facility Arrangements

Arrangements will be made to construct appropriate support facilities and/or procure equipment necessary to perform an RI/FS investigation. This will require preparation of decontamination facilities, a secure area for the temporary storage of contaminated soils and water, utility hook-ups for the site trailer, and site access control stations.

5.2 SOURCE CHARACTERIZATION

An investigation will be performed to identify and characterize the chemical and physical nature of the waste materials and affected media at the site. The source characterization investigation is intended to focus on waste and site characteristics and will involve the use of direct and remote techniques to delineate the source areas and if possible, contamination pathways. In addition, historical photographs will be reviewed to locate potential source areas. Several potential source areas have been identified as a result of previous investigations (see Drawing 15268-6). These areas include:

- the former foundry sand disposal area;
- the Beloit Corporation storage yard areas;
- the abandoned waste water treatment ponds;
- the former fiber spreading area;
- the former Soterion Oil/United Recovery Plant;
- specific locations in the Blackhawk Acres Subdivision;
- the gravel pit located in the northeast corner of the site; and
- Rockton Excavating.

Additional areas identified by the IEPA will be investigated during the soil gas investigation task. These areas include:

- the R&D Facility;
- possible impoundments noted by a U.S. EPA evaluation of aerial photographs (U.S. EPA, 1990); and
- Beloit Corporation manufacturing plant perimeter.

5.2.1 Soil Gas Survey

A soil gas survey will be conducted over the majority of the site, but will be concentrated at the previously described potential source area locations. The approximate location of each survey point is displayed on Drawing 15268-6. If (a) potential source(s) is/are identified during the initial round of soil gas sampling, a more concentrated grid of soil gas samples may be selected by Warzyn's RI/FS hydrogeologist/engineer around the suspect areas for an additional sampling round. Soil gas samples will be analyzed in the field using a portable gas chromatograph (GC) unit. Therefore, two rounds of sampling and analysis can be performed with little to no delay between rounds. If a potential contaminant source area is identified, soil samples will be collected and chemically analyzed to characterize residual contamination that may exist.

Section 5.1.3 of the Field Sampling Plan (Appendix A of the QAPP) presents detailed information regarding the sampling procedures and equipment. Target compounds and QA objectives for the analyses are described with the methods description in the QAPP.

5.2.2 Shallow Soil Borings and Soil Sampling

Shallow soil borings will be performed in potential contaminant source areas as identified in Section 5.2 and as identified during the soil gas survey. Tentative locations and numbers of soil borings are shown on Drawing 15268-7. Additional borings may be selected based on the results of the surface geophysical and soil gas surveys. The purpose of these soil borings is to provide subsurface soil descriptions and to collect samples of potentially contaminated soils for laboratory analysis. Each shallow soil boring will be advanced to the water table

(25 to 35 ft) using hollow stem augers and continuous split spoon sampling. Soils collected with the split spoon sampler will be visually described (evidence of contamination will also be noted on the soil borehole log) by a geologist/engineer using the Unified Soil Classification System (USCS). Representative samples will be placed in labeled sample containers. Soil samples to be evaluated for potential laboratory analysis will be collected from each split spoon. A vertical split sample will be collected, immediately after opening the split spoon, in a 4 oz. sample jar for potential volatile organic compound (VOC) laboratory analysis. A separate vertical split sample will be collected for field screening. Field screening will consist of the headspace method described in Section 5.2.3 of the Field Sampling Plan (FSP). Soil samples will be selected for laboratory analysis of U.S. EPA CLP Target Compound List (TCL) organics and Target Analyte List (TAL) inorganics based on the following criteria:

- 11.7 eV photoionization detector (PID) or flame-ionization detector (FID) readings;
- Visual evidence of soil contamination; and
- Distinct soil stratigraphic changes (e.g., contact at aquifer/aquitard boundary).

A minimum of 24 soil samples (an average of two samples per soil boring) will be submitted for analysis with at least one sample having been collected from each soil boring. Soil sample selection will be made in the field and PID/FID screening will be the primary basis for this selection. A background PID/FID reading will be established upwind of the site to use as a comparative value in the screening process. Soil samples with the highest PID/FID readings (> background) will be selected for analysis. The selection process is described as follows:

- If there are no detectable PID/FID readings above background, then samples with the most visible evidence of contamination will be selected.
- If no PID/FID readings above background, and/or visual contamination are (is) observed, then samples of aquifer material collected at distinct soil stratigraphic changes will be selected.
- If no PID/FID readings above background, and/or visual contamination and/or distinct soil stratigraphic changes are (is) observed, then soil samples collected at a depth of approximately 10 ft (where low or no detectable soil gas concentrations occurred) or 5 ft (where high soil gas concentrations were detected) will be selected for analysis.

Each soil boring will be abandoned using the methods described in Section 5.2.3 of the FSP. Boring locations will be marked with a flagged wooden stake and identified for later surveying.

Surface soil samples will be obtained from the locations chosen for the shallow soil borings. The purpose for these samples is to enable the risk assessment to evaluate risks to potential exposure to surface soils. The samples will be collected from the upper six inches of soil and will be analyzed for the same parameters listed above for the shallow soil borings.

5.2.3 Electromagnetic/Magnetometer Survey

Information collected during previous investigations conducted by Beloit Corporation indicated the possible existence of an underground storage tank at 1314 Watts Avenue in Blackhawk Acres Subdivision. Also, information provided to Beloit Corporation by the IEPA indicates the existence of underground storage tanks at Soterion. Electromagnetic (EM)/magnetometer surveys will be conducted at 1314 Watts Avenue and Soterion to determine the presence and location of underground storage tanks and/or buried metal drums.

5.3 MIGRATION PATHWAY ASSESSMENT

The migration pathway assessment will be conducted concurrently with and subsequent to the Source Characterization investigative tasks. Each media will be evaluated to determine if it is a potential migration pathway for the distribution of contamination.

5.3.1 Hydrogeologic Assessment

A hydrogeologic assessment will be performed to further evaluate subsurface geologic and groundwater flow conditions. The objective of the assessment is to determine groundwater flow patterns by characterizing site hydrostratigraphy, controlling geologic features, potential for preferential groundwater flow and the distribution of hydraulic heads within the permeable zones. This study will include natural gamma logging of geotechnical boring GB1, select new and existing wells, and groundwater quality borings (both deep and intermediate). The study will also include sampling, drilling, groundwater quality profile sampling, installation of monitoring wells, measurement of water levels, and estimations of aquifer hydraulic conductivity. The results of this hydrogeologic assessment will be combined with the results of the Source Characterization to evaluate the vertical and lateral extent of contaminant migration.

5.3.1.1 Geophysical Investigation - After review of site data, it is anticipated that most surface geophysical techniques will not be feasible at this site, with the exception of EM and magnetometry for the purpose of locating buri

and/or buried storage tanks at 1314 Watts Avenue and Soterion. The presence of utilities, buildings, structures, and equipment prevent reliable use of seismic, resistivity, or other common surface geophysical techniques used to differentiate stratigraphic or pore fluid contrasts within the glacial aquifer. In addition, the detection of clay and/or till units less than 10 to 15 ft thick at a depth greater than or equal to 60 ft would not be reliable with the surface geophysical methods available.

A down-hole natural gamma ray logging tool will be used on existing new monitoring wells, groundwater quality borings in order to differentiate and identify soil stratigraphic units, and variations in the clay content in the soil matrix. The natural gamma ray logging tool will be ground truthed in geotechnical boring GB1.

5.3.1.2 Documentation of High Capacity Wells - Information including location of high capacity wells within 2 miles of the site, type of pumps used, pumping rates and durations, and water level fluctuation will be obtained to assess the effects of pumping on groundwater flow patterns.

5.3.1.3 Water Supply Well Sampling - The migration pathway investigation performed during Phase 1 of the RI will be used to identify any additional water supplies in the vicinity of the site which should be sampled for groundwater quality. The additional water supplies will be identified following analysis of Phase 1 data and the assessment of contaminant source locations. Additional water supply well sampling will be performed, only if needed, to supplement the initial private well sampling to be conducted in the Blackhawk Acres Subdivision. The private wells to be sampled during Phase 1 and the analytical procedures to be applied are presented in a separate document prepared by Beloit Corporation and approved by the IEPA. The Phase 1 water supply investigation will also be used to identify which groundwater quality parameters can be eliminated from additional water supply well sampling rounds.

5.3.1.4 Monitoring Well Installation/Replacement and Soil Sampling - The objective for conducting borings at the site is to further characterize site hydrogeology and to evaluate and identify groundwater contamination by obtaining groundwater samples for on site GC analysis. The objective for installing additional groundwater monitoring wells is to obtain aquifer hydraulic and water level data to determine aquifer properties, the local groundwater flow direction, and to collect groundwater quality data to evaluate for the presence or absence of groundwater contamination. Twenty-two borings will be drilled at 14 locations to evaluate site specific subsurface stratigraphy and groundwater quality, and for the installation of 12 and replacement of 4 groundwater monitoring wells (total of 16 wells) (Drawing 15268-7). Groundwater monitoring wells may also

Omit

and/or buried storage tanks at 1314 Watts Avenue and Soterion. The presence of utilities, buildings, structures, and equipment prevent reliable use of seismic, resistivity, or other common surface geophysical techniques used to differentiate stratigraphic or pore fluid contrasts within the glacial aquifer. In addition, the detection of clay and/or till units less than 10 to 15 ft thick at a depth greater than or equal to 60 ft would not be reliable with the surface geophysical methods available.

A down-hole natural gamma ray logging tool will be used on existing new monitoring wells, groundwater quality borings in order to differentiate and identify soil stratigraphic units, and variations in the clay content in the soil matrix. The natural gamma ray logging tool will be ground truthed in geotechnical boring GB1.

5.3.1.2 Documentation of High Capacity Wells - Information including location of high capacity wells within 2 miles of the site, type of pumps used, pumping rates and durations, and water level fluctuation will be obtained to assess the effects of pumping on groundwater flow patterns.

5.3.1.3 Water Supply Well Sampling - The migration pathway investigation performed during Phase 1 of the RI will be used to identify any additional water supplies in the vicinity of the site which should be sampled for groundwater quality. The additional water supplies will be identified following analysis of Phase 1 data and the assessment of contaminant source locations. Additional water supply well sampling will be performed, only if needed, to supplement the initial private well sampling to be conducted in the Blackhawk Acres Subdivision. The private wells to be sampled during Phase 1 and the analytical procedures to be applied are presented in a separate document prepared by Beloit Corporation and approved by the IEPA. The Phase 1 water supply investigation will also be used to identify which groundwater quality parameters can be eliminated from additional water supply well sampling rounds.

5.3.1.4 Monitoring Well Installation/Replacement and Soil Sampling - The objective for conducting borings at the site is to further characterize site hydrogeology and to evaluate and identify groundwater contamination by obtaining groundwater samples for on site GC analysis. The objective for installing additional groundwater monitoring wells is to obtain aquifer hydraulic and water level data to determine aquifer properties, the local groundwater flow direction, and to collect groundwater quality data to evaluate for the presence or absence of groundwater contamination. Twenty-two borings will be drilled at 14 locations to evaluate site specific subsurface stratigraphy and groundwater quality, and for the installation of 12 and replacement of 4 groundwater monitoring wells (total of 16 wells) (Drawing 15268-7). Groundwater monitoring wells may also

be installed in deep groundwater quality borings DB1 through DB4 and/or intermediate groundwater quality boring IB1 if GC results indicate the presence of VOCs.

Sixteen of the 22 borings will be used to construct groundwater monitoring wells, 4 of which will replace existing monitoring wells W3, W5, W8, and W11. These borings will be drilled with hollow stem auger, rotary wash, or air rotary drilling techniques.

The 5 deep groundwater quality borings (DB1 - DB4 and W22C) will be drilled to a minimum depth of 100 ft using the dual tube reverse circulation air rotary drilling method. The two intermediate depth groundwater quality borings, IB1 and W23B, will be drilled to a minimum depth of 70 ft using plugged, screened hollow stem augers. These seven borings will be drilled for the purpose of collecting groundwater samples at 10 ft intervals for groundwater quality evaluation in order to determine the vertical distribution of groundwater contamination beneath the site; to note lithology changes with depth; and possibly to determine depth to top of bedrock beneath the site. These groundwater quality results will be used as screening data to evaluate the presence of VOCs beneath the site at the seven locations and to determine the optimal depth for monitoring well screen placement. One to five additional groundwater monitoring wells may be installed in these groundwater quality borings based on the GC groundwater analytical results and stratigraphy collected from deep borings DB1 through DB4, and intermediate boring IB1. Five of these locations are located on Beloit Corporation property and two in the Blackhawk Acres Subdivision (refer to Drawing 15268-7). One of the borings is adjacent to well nest W3/W5 and is intended to determine the depth and profile of potential VOC contamination at this location, and where to place replacement screens for monitoring wells W3 and W5. Three of the other four borings are located on the southeast side of the Beloit Corporation property and will assist in determining potential VOC contaminant transport to the south and southeast. Deep boring DB3 is located on the City right-of-way at 910 Watts Avenue and IB1 is located at 1314 Watts Avenue in Blackhawk Acres Subdivision. Groundwater quality borings IB1, DB3, DB4, and W22C will also be used to explore the potential for the lateral migration of contaminants from the Beloit Corporation property to the Blackhawk Acres Subdivision. The borings in the Blackhawk Acres Subdivision will also serve to determine the vertical extent of contamination affecting certain private water supply wells along Watts Avenue. A detailed description of the reverse air rotary drilling technique is located in Appendix A-A2 of the Field Sampling Plan (Appendix A of the QAPP).

One deep geotechnical boring (GB1) will be advanced to approximately 100 ft using mud rotary drilling techniques. This boring will be used to ground truth the

gamma ray logging tool and to provide a representative stratigraphic sequence for the site. Methods are described in Section 5.4.3 of the FSP. Drawing 15268-7 shows the location of this boring at the same location as existing standpipe 11.

The monitoring wells, with the exception of wells W23B and W22C, will be drilled using 4 1/4-in. ID or 6 1/4-in. ID open hollow stem augers. Wash boring methods may be used if difficult drilling conditions (e.g., sand blow-in) are encountered using hollow stem augers. If wash boring methods are used, the borehole will be temporarily cased and completed using clear water obtained from the City of Rockton. In the event clear water does not remove cuttings or the borehole is unstable, a pure bentonite mud wash will be necessary to complete the boreholes. During drilling operations, attempts will be made to maintain the consistency of the bentonite mud so that cutting removal is maximized and borehole wall infiltration is minimized. Casing will be advanced to the bottom of the borehole immediately following each 10 ft advance of the borehole. This will minimize the mud/borehole well contact time. Bentonite with chemical additives will not be used at the site.

During drilling, soil samples will be collected at each monitoring well (except at a well nest where only the deepest boring is to be sampled) at 2.5-ft intervals with a 2-in. split spoon sampler where feasible (see Section 5.4.3.2 of the FSP for details). Soils will be visually described and classified in the field and soil boring logs recorded by a geologist. Soils representative of stratigraphy will be stored in 8 oz. soil sample jars. Soil samples will be field screened with a PID to assess the potential hazard to the field personnel. Borehole cuttings indicating a PID measurement greater than 5 ppm over background will be separated from clean cuttings, containerized and stored on site. Disposition of borehole cuttings will be determined based on the results of soil analytical results and composite TCLP analysis.

Sixteen borings will be instrumented with 12 new groundwater monitoring wells and 4 replacement wells. All monitoring wells will be completed in the glacial aquifer. Proposed locations are shown on Drawing 15268-7. This includes eight water table wells, seven intermediate wells and 1 deep well. The rationale, locations, and approximate depth for proposed monitoring wells is summarized in Table 2.

Drawings 15268-A7 and 15268-A8 show monitoring well construction details. Monitoring wells will be constructed of a composite of 2-in. I.D. threaded flush joint Schedule 40 or 80 PVC and stainless steel. Schedule 80 PVC pipe will be used in monitoring wells greater than 80 ft deep. A No. 10 continuous-wrap 304 or 316 stainless steel screen will be used to exclude fines. Water table wells will consist of a 10-ft long screen, placed to intersect the water table surface, and

Schedule 40 PVC riser to ground surface. Deep wells (piezometers) will have 5-ft long screens with a 10 ft section of stainless steel riser above the screen. Schedule 40 or 80 PVC riser, depending on total well depth, will be used to complete the well to ground surface. A silica sand filter pack will be installed surrounding the well screen. The wells will be installed within the hollow stem auger string and the augers extracted slowly as the filter pack and borehole annulus sealing materials are placed. The filter pack will be installed to 2 feet above the top of the screen. Fine silica sand (approximately 0.2-0.4 mm grain size) followed by 3 to 5 ft of bentonite pellets will be placed on top of the filter pack to prevent downward migration of the annular space sealant. The remainder of the borehole annulus will be backfilled with a thick bentonite slurry using a tremie pipe (well construction details are presented in Section 5.4.3.2 of the FSP). As approved by IEPA during Work Plan negotiations, this well construction, combined with the sampling method specified in Section 5.4.1, will isolate the PVC well material from direct contact with any groundwater.

Locking steel protective casings and granular bentonite surface seals will be installed at the surface of all wells. Typical water table well construction details following ASTM are shown on Drawing 15268-A7. Typical deep well construction details following ASTM are shown on Drawing 15268-A8.

Each well will be developed after installation by first surging the well with a bailer and then removing at least 10 casing volumes of water using a bailer or pump. The following information will be recorded during and after well development:

- date and time;
- total well depth;
- depth to groundwater;
- time spent on development;
- volume of water removed;
- visual water turbidity before and after development;
- rate of pumping during development; and
- pH and specific conductivity readings.

The disposition of drill cuttings, drilling fluids (mud and water), extraneous soils derived from split spoon sampling, and development, drilling, and purge water will be determined as detailed in Section 3.2.1.3 of the FSP (Appendix A of the QAPP) and in accordance with U.S. EPA's guidance document (May 1991) on the management of investigation derived wastes during site inspections.

5.3.1.5 Location and Elevation Survey - A location and elevation survey will be performed to locate soil borings, monitoring wells, and other sampling locations.

Sampling points will be located to an accuracy of ±1 ft horizontally, the top of each monitoring well pipe will be surveyed to an accuracy of ±0.01 ft vertically, and ground surface to ±0.1 ft.

5.3.1.6 Groundwater Level Measurements - Groundwater level measurements will be made at existing and new wells at least four times during the migration pathway assessment and on a bi-monthly basis for a period of one year. The number of measurement periods may be reduced or discontinued if review of data collected during the migration pathway assessment suggests temporal water level variations are minimal (e.g., quarterly measurements may be proposed). Groundwater level measurements will be taken during each groundwater sampling event. Surface water elevations will also be taken at the Rock River during each measurement event. Existing functional wells for which construction details exist will be included in the water level surveys.

5.3.1.7 Hydraulic Conductivity Testing - Hydraulic conductivity testing of the new monitoring wells and existing functional wells will be performed. In situ single well hydraulic conductivity tests will be performed to assess hydraulic conductivity and groundwater flow rates. Data will be analyzed using the Bouwer and Rice method. Methods are detailed in Section 5.4.3.3 of the FSP (Appendix A of the QAPP).

5.3.2 Surface Water and Sediment Investigation

Drainage patterns and runoff characteristics will be evaluated for potential surface water and erosional transport of contaminants. A visual inspection of the site will be performed to determine surface water drainage directions. Drainage patterns will be mapped and presented in the RI report. Three staff gauges will be installed along the Rock River to monitor surface water levels at the time groundwater levels are measured. Information regarding operation of the Rockton dam will be obtained from the dam owner/operator.

Field observations and correlation of staff gauge readings with groundwater flow conditions will be used to evaluate the potential for surface water or sediment transport as a potential migratory pathway. If assessed as a potential migratory pathway, appropriate surface water and sediment sampling locations will be chosen for the contaminant characterization investigation. A comparison of groundwater and staff gauge readings will be performed to evaluate bank storage effects on groundwater flow. A comparison of pumping records from major water supply wells will be performed to identify potential pressure head effects on groundwater flow.

5.3.3 Air Quality Assessment

Based on review of existing information, air is not a significant migration pathway. However, to assess this pathway, monitoring will be conducted during drilling to assess "worst case" conditions when subsurface soils and/or waste are exposed to the atmosphere. Air quality will be monitored using a PID during site investigations for health and safety purposes.

5.4 CONTAMINANT CHARACTERIZATION

The objective of the Contaminant Characterization program is to evaluate the magnitude and extent of contaminant migration along pathways of concern at the site. Phase 1 Contaminant Characterization will consist of:

- groundwater quality characterization;
- surface water and sediment characterization; and
- air characterization.

The chemical character of site soils will be evaluated as described in Section 5.2.2, Shallow Soil Borings and Soil Sampling. Samples will be collected, handled and analyzed in accordance with protocols and procedures described in the FSP and QAPP.

Phase 1 results will be presented in Technical Memorandum No. 1. A Phase 2 investigation may be necessary if data gaps exist after completion of Phase 1. Round 2 groundwater quality sampling will be conducted during Phase 2. Round 2 groundwater samples will be analyzed only for contaminants of concern identified during Round 1.

5.4.1 Groundwater Quality Characterization

Groundwater quality characterization will be conducted to evaluate the magnitude and extent of groundwater contamination in the vicinity of the site. Two rounds of groundwater samples will be collected. Round 1 will consist of sampling the 16 monitoring wells installed during Phase 1 and 14 existing monitoring wells constructed with stainless steel. Samples will be analyzed for U.S. EPA TCL/TAL parameters and water quality indicator parameters. Water quality indicator parameters will also include:

- Field pH;
- Field Specific Conductance;
- Chloride;
- Sulfate;
- Alkalinity;
- Total Phenolics;

- Nitrate-Nitrite Nitrogen;
- Ammonia Nitrogen; and
- Total Dissolved Solids.

Results of Round 1 will be used to determine contaminants of concern. Round 2 sampling, at a minimum, will consist of sampling wells and analyzing samples for indicator parameters and contaminants of concern identified during Round 1.

Details on sampling methods, collection of blanks and duplicates, preservation of samples, and sample handling are contained in the QAPP and Sections 3.3 and 3.4 of the FSP.

5.4.2 Surface Water and Sediment Characterization

Surface water and sediment sampling will not be conducted during Phase I of the investigation. There are no known surface water bodies within the site boundaries. However, an investigation of seasonal occurrences of surface water bodies and drainage swales will be performed. If any are located on-site, or in the area between the site and the Rock River, sampling may be performed as part of subsequent investigations (Phase 2).

5.4.3 Air Quality Characterization

Ambient air will be monitored during Phase 1 field activities with methods detailed in Section 5 of the Health and Safety Plan. Weather data will be obtained from a local weather station and recorded.

JEM/TJK/vlr/KJD/KJQ/DWH
[vlr-601-46d]
15268.03

6

TASK 3
SITE INVESTIGATION ANALYSIS

6.1 QUALITY ASSURANCE/QUALITY CONTROL (QA/QC)

The objective of this activity is to determine whether RI data are of sufficient quantity and quality to support the Baseline Risk Assessment and the Feasibility Study. The QA/QC evaluation will determine if the data meet the requirements of the QAPP and will include a detailed evaluation of sampling data quality. Data usage is limited by the quality of the laboratory analysis and the quality of the sample itself. Data quality will be assessed based on the laboratory and field quality control (QC) criteria as described in the QAPP. Data quality objectives are listed in Table 1-3 of the QAPP. Assessment of data quality will be made by the performing laboratory during analysis and by Warzyn during data validation.

6.2 SITE PHYSICAL CHARACTERISTICS

Data will be analyzed to describe the environmental setting at the site, including features such as soils, geology, hydrology, and meteorology. This analysis will focus on the relationship between these factors, and contaminant fate and transport.

6.3 CONTAMINANT SOURCE CHARACTERISTICS

Data obtained during the source characterization phase will be analyzed to describe:

- locations where contaminants may have been released;
- the soil types underlying a source area and the properties controlling migration to the water table;
- the nature of existing waste contaminants; and

- the types, quantities, concentrations, and chemical and physical properties of hazardous substances detected. The actual and potential releases of contaminants from the source(s) and the mobility and persistence of contaminants will also be evaluated.

6.4 NATURE AND EXTENT OF CONTAMINATION

Contaminant concentration levels detected in environmental media will be described. The horizontal and vertical extent of contamination in soil, groundwater, and sediment will be described. Spatial and temporal trends of contaminants will be evaluated, if appropriate. Data will be summarized in tabular form for ease of reference. Drawings will be prepared showing the extent of contamination.

6.5 CONTAMINATION FATE AND TRANSPORT

The results of the physical site characterization, source characterization, and nature and extent of contamination evaluations will be combined to produce an analysis of contaminant fate and transport. If possible, the observed extent of contamination will be evaluated to assess the rate of contaminant migration and the fate of contaminants. Field data will be used to determine the extent of contamination. If necessary, models may be utilized to interpolate and/or extrapolate available data to areas where data is not available.

6.6 DATA MANAGEMENT

The consistency and quality of data compiled during the RI will be documented. Information gathered during site characterization will be documented and adequately recorded in well maintained field logs and laboratory reports. The methods of documentation are described in the Data Management Plan. Field logs will be utilized to document observations, measurements and significant events which have occurred during field activities. Laboratory reports will document sample custody, analytical responsibility, analytical results, adherence to prescribed protocols, nonconformity events, corrective measures and/or data deficiencies (see QAPP).

Field reports, sample shipment records, analytical results, and QA/QC reports will be maintained, so only validated data are reported and used during the project. A data security system will be established to safe guard chain of custody forms and other project records to prevent loss, damage, or alteration of project documentation.

6.7 REPORTS

6.7.1 Progress Reports

Monthly progress reports will be prepared to describe the technical progress during the RI/FS. Two copies of these reports will be submitted to the IEPA, Illinois Attorney Generals Office (IAGO) and U.S. EPA by the fourteenth calendar day of each month, following the commencement of the work detailed in the RI/FS Work Plan. The monthly progress reports will include the following information:

- A description of the actions that have been taken toward achieving compliance with the Consent Order;
- Results of sampling tests, analytical data and other information generated pursuant to the Consent Order;
- A description of data anticipated and activities scheduled for the next 30-day period;
- A description of any problems encountered or anticipated;
- A description and schedule of actions taken to correct any such problems; and
- A description and schedule of activities planned for the following month(s).

6.7.2 Technical Reports

The results of specific remedial RI/FS investigation activities will be submitted to the IEPA, IAGO, and the U.S. EPA throughout the process. These reports will initially be submitted in draft form. Responses to the IEPA and the U.S. EPA comments on draft technical reports will be addressed in letters from the respondent project coordinator to the IEPA and the U.S. EPA remedial project manager. Responses will be incorporated into the final reports. These specific technical reports include:

- Technical Memorandum No. 1 - This memorandum will describe source characterization, migration pathway assessment, and contaminant characterization methods and results. Round 1 groundwater sampling data will be discussed and Round 2 groundwater sampling program proposed. It may also include proposed Phase 2 activities. Phase 2 activities will not be initiated until Technical Memorandum No. 1 has been approved by the IEPA. The need for treatability studies (e.g., in support of an operable unit

or if results of investigation indicate the need) will be discussed based on source characterization and the exposure pathways of concern. Remedial action objectives will be revised, if necessary.

- Technical Memorandum No. 2 - This memorandum will only be written if a Phase 2 investigation is required. Technical Memorandum No. 2 will include all data collected during the Phase 2 investigation as well as identification of possible remaining results of data needs (data collected beyond a second phase of work will not be presented in a technical memorandum, but will be incorporated into the RI Report). The need for treatability studies will continue to be considered.

- Remedial Investigation Report/Baseline Risk Assessment - This report will summarize the data collected in the RI and presented in the Technical Memoranda. It will also include the Baseline Risk Assessment which provides an assessment of an evaluation of the threat to human health and the environment posed by the site. This Baseline Risk Assessment will be prepared by the IEPA and reviewed by Beloit Corporation.

- Alternatives Array Document - This report will summarize the technology screening process, provide a description of remedial action alternatives, and request the Agencies to provide possible chemical-specific, location-specific, and action-specific ARARs to Warzyn.

- Feasibility Study - This Report will present remedial actions which were evaluated as part of the RI/FS study and were designed to protect human health and the environment.

TJK/JEM/vlr/KJD/KJQ/DWH
[vlr-601-46e]
15268.03

7

BASELINE RISK ASSESSMENT

A Baseline Risk Assessment will be completed to identify risks associated with the no action alternative. The Baseline Risk Assessment will be conducted as described in the SOW. Preparation of the Risk Assessment will begin after completion of RI activities and will be referenced in the RI Report. The risk assessment will be completed as a stand-alone document.

The Baseline Risk Assessment will be prepared to evaluate the actual or potential threat to public health, welfare, or the environment presented by the "no-action alternative". Actual or potential risks associated with site-related chemicals will be quantified whenever possible. A general outline of work for the Baseline Risk Assessment is as follows:

- Select target chemicals for evaluation based on their degree of contribution to the risks associated with the site;
- Conduct exposure assessments that include the identification of acute and chronic hazards of concern and the population(s) at risk;
- Evaluate existing toxicity information and assess the potential for acute and chronic effects of the site-related contaminants as well as specific effects such as carcinogenicity, reproductive dysfunction, teratogenicity, neurotoxicity and other metabolic alterations; plus the effect on aquatic and terrestrial wildlife posed by site-related substances;
- Assess impact by identifying acceptable exposure guidelines or standards, comparing estimated doses with these guidelines or standards. For target chemicals at the site that are designated as carcinogens by U.S. EPA, Agency evaluations and techniques should be utilized to estimate the increase in cancer risks;
- Sources and magnitude of uncertainties generated in the risk assessment process may be identified as recommended by U.S. EPA guidance. This activity will evaluate the impact on the analysis of uncertainties propagated through the Baseline Risk Assessment and FS; and

- An Ecological Assessment will also be conducted to evaluate potential site impacts on aquatic and terrestrial species. A preliminary survey of habitat, species and other significant ecological features will be performed. The Ecological Assessment will be performed by the IEPA and reviewed by Beloit Corporation.

TJK/JEM/vlr/KJD/KJQ/DWH
[vlr-601-46f]
15268.03

8

TASK 4
LABORATORY AND BENCH SCALE STUDIES

The purpose of this task is to provide additional data to support the detailed analysis of remedial technology alternatives. The need for additional data will be identified. Additional data gathered may involve site characterization, waste characterization, exposure pathway characterization, other materials testing or bench scale treatability studies. The need for treatability testing will be continually assessed throughout the RI/FS process. An evaluation of potential technologies and the need for treatability studies will be presented in Technical Memorandum No. 1 and subsequent Technical Memoranda. Two subtasks are included as described below.

8.1 DETERMINATION OF DATA REQUIREMENTS

Additional data needs will be identified by assessing the unknowns associated with the site and/or the application of specific technologies at the site. A literature survey will be conducted to determine whether adequate performance and application data exist for a particular technology, and to determine testing requirements.

Based on this information, a determination regarding the need for treatability testing will be made by the Respondents, the IEPA, and U.S. EPA. A preliminary evaluation of potential technologies and the need for laboratory and bench scale treatability testing will be addressed in Technical Memorandum No. 1 and subsequent Technical Memoranda.

8.2 TREATABILITY TESTING STUDIES FOR FIELD INVESTIGATIONS

The purpose of this subtask is to plan, carry out, evaluate, and report on the supplemental field bench scale treatability testing investigations. Because of the uncertainty regarding the need for a treatability study at this stage in the process, no specific program is proposed.

Investigations or testing may be used to adequately evaluate a specific remedial technology for application at the site. The evaluation may be oriented toward a performance assessment, process sizing, materials identification, and testing or cost estimation. The goal of investigation or testing is to support the remedy selection process. In general, the following activities would be included in this subtask:

- Work Plan preparation (or revisions to existing Work Plan), including a treatability study, Sampling and Analysis Plan, and/or Health and Safety Plan;

- Field investigation or sampling, and/or laboratory testing, and/or pilot bench scale testing;

- Analysis of data collected during the investigation or testing program; and

- Report preparation.

TJK/JEM/vlr/KJD/KJQ/DWH
[vlr-601-46g]
15268.03

9

TASK 5
COMMUNITY RELATIONS

Community relations activities are the primary responsibility of the IEPA and will be performed in accordance with the Consent Decree. The IEPA will implement the Community Relations Plan (CRP). Beloit Corporation will cooperate with IEPA and take an active role in community relations activities, such as participating in public meetings. In addition, Beloit Corporation will review public news releases, such as fact sheets.

TJK/JEM/vlr/KJD/KJQ
[vlr-601-46i]
15268.03

10

FEASIBILITY STUDY

The purpose of the FS is to develop and evaluate alternative remedial actions that will protect human health and the environment, and present relevant information upon which a remedy selection can be based.

The FS will conform to Section 121 of CERCLA; the NCP as amended; the FS guidance, as amended; the Statement of Work; U.S. EPA policy; and IEPA policy. The FS is comprised of the following tasks:

- Task 7 - Development and Screening of Remedial Alternatives; and
- Task 8 - Detailed Analysis of Remedial Alternatives.

10.1 TASK 7 - DEVELOPMENT AND SCREENING OF REMEDIAL ALTERNATIVES

The purpose of this task is to develop a range of remedial alternatives for the site. This task constitutes the first stage of the FS and is comprised of interrelated subtasks. The subtasks described below may be viewed as steps that involve making successively more specific definitions of potential remedial activities. Available data will be evaluated throughout this task to determine if a sufficient quantity of useable data has been collected to complete the FS.

10.1.1 Establishment Of Remedial Action Objectives

Site-specific objectives for the remedial action will be developed and refined, considering the description of the current situation, information gathered during the RI and the Baseline Risk Assessment, Section 300.430 of the National Contingency Plan (NCP), the U.S. EPA's interim guidance, and the requirements of other applicable U.S. EPA, Federal, and IEPA environmental standards, guidance, and advisories. Remedial Action objectives will be developed in accordance with the SOW.

These objectives consist of media-specific or operable unit-specific goals for protecting human health and the environment. They will specify the contaminant(s) of concern, exposure route(s), receptor(s), and an acceptable contaminant level or range of levels for each exposure route.

Acceptable contaminant levels will be determined on the basis of risk factors and contaminant-specific ARARs. Contaminant levels in each media will be compared with these acceptable levels, which will be determined on the basis of an evaluation of the following factors:

- For carcinogens, whether the chemical-specific ARARs provide protection within the risk range of 10^{-4} to 10^{-6} and whether achievement of each chemical-specific ARAR will sufficiently reduce the total risk from exposure to multiple chemicals.

- For non-carcinogens, whether the chemical-specific ARAR is sufficiently protective if multiple chemicals are present at the site.

- Whether environmental effects (in addition to human health effects) are adequately addressed by the ARARs.

- Whether the ARARs adequately address all significant pathways of human exposure identified in the Baseline Risk Assessment. For example, if exposure from the ingestion of fish and drinking water are both significant pathways of exposure, application of an ARAR that is based only on drinking water ingestion (e.g., MCLs) may not be adequately protective.

If an ARAR is determined to be protective, it will be used to establish the acceptable exposure level. If not (presents a risk greater than 10^{-4}), or does not exist for the specific chemical or pathway of concern, or multiple contaminants may be posing a cumulative risk, acceptable exposure levels will be identified through the risk assessment process. The Risk Assessment Guidance for Superfund, Volume 1 - Human Health Evaluation Manual and Volume 2 - Environmental Evaluation Manual (1989) will serve as the primary source of guidance for risk assessment.

Clearly, the determination of acceptable exposure levels will depend on the availability of site investigation results. Where possible, preliminary response objects will be established based on existing site information and a qualitative assessment of potential risks. Response objectives will be revised as information from the RI becomes available.

10.1.2 Development Of General Response Actions

The purpose of this subtask is to identify general response actions that will meet the identified remedial action objectives. Response actions may include source control measures, migration control measures or both, depending on the media and/or exposure pathways that may need to be addressed.

10.1.3 Initial Area And Quantity Determination

The purpose of this subtask is to identify areas of concern and quantities of material to be addressed by the general response actions for each medium of concern. This initial determination will be made based on the initial site evaluation and information from the RI as it becomes available.

10.1.4 Identification, Screening And Documentation Of Remedial Technologies/Process Options

The purpose of this subtask is to consider a range of potentially applicable remedial technologies, and identify a limited number of specific process options that may be used to address site conditions. Conceptually, the screening process may be viewed as consisting of the following:

- Identification of the general technology types associated with the general response actions.
- Identification of process options associated with each technology type.
- Screening technology types and process options based on an evaluation with respect to technical implementability.

Technologies and process options that cannot be effectively implemented at the site will be eliminated from further consideration. This screening will be based on information from the RI and on technology capabilities/limitations. Results of the screening will be summarized in the Alternatives Array Document.

Typically, one or two process options representing each technology type considered viable will be selected. Process options will be evaluated using effectiveness, implementability, and cost criteria. Limiting the number of specific process options is intended to make the development and screening of alternatives manageable by limiting the potential number of alternatives developed. Results of the process options evaluation will be presented in tables. Specific process options for actual implementation will be selected during the Remedial Design (RD) phase activity.

10.1.5 Assembly and Documentation Of Alternatives

Alternatives will be assembled by combining general response actions and the process options chosen to represent the various technology types for each media or operable unit. Alternatives will be formulated to provide comprehensive site remedies. Operable unit alternatives may be developed if this approach is determined to be advantageous. Alternatives to be developed will include the following:

- treatment alternatives for source control that eliminate or reduce the need for long-term management (including monitoring); and

- alternatives involving treatment as a principal element to reduce the toxicity, mobility, or volume of waste.

At least two additional alternatives will be developed, including the following:

- an alternative that involves containment of waste with little or no treatment, but provides protection of human health and the environment primarily by preventing exposure or reducing the mobility of the waste; and

- a "no action" alternative.

10.1.6 Alternatives Definition

In this subtask, alternatives will be further defined to form a basis for evaluating and comparing them prior to their screening. Sufficient quantitative information to allow differentiation among alternatives with respect to effectiveness, implementability, and cost is required. Parameters that may require additional refinement include the extent or volume of contaminated material and the size of major technology and process options. The following information will be developed, as appropriate, for the various technology processes used in an alternative:

- size and configuration of on site extraction and treatment systems or containment structures;

- time frame in which treatment, containment, or removal goals can be achieved;

- process flow rates and/or rates of treatment;

- spatial requirements for constructing treatment or containment technologies or for staging construction materials or excavated soil or waste;

- distances to disposal or treatment facilities; and

- required permits and imposed limitations.

10.1.7 Initial Screening Of Alternatives

In this subtask, defined alternatives will be evaluated against short- and long-term aspects of three broad criteria: effectiveness, implementability, and cost. These are described as follows:

- Effectiveness: Alternatives will be evaluated to determine whether they adequately protect human health and the environment; attain Federal and Illinois ARARs or other applicable criteria, advisories, or guidance; significantly and permanently reduce the toxicity, mobility, or volume of the hazardous constituents; are technically reliable; and are effective in other respects. The consideration of reliability will include the potential for failure and the need to replace the remedy.

- Implementability: Alternatives will be evaluated as to the technical feasibility and availability of the technologies that each alternative would employ; the technical and institutional ability to monitor, maintain, and replace technologies over time; and the administrative feasibility of implementing the alternative.

- Cost: The cost of construction and long-term costs to operate and maintain the alternative will be evaluated. This evaluation will be based on conceptual costing information and not a detailed cost analysis. At this stage of the FS, cost will be used as a factor when comparing alternatives that provide similar results, but will not be a consideration at the screening stage when comparing treatment and non-treatment alternatives.

10.1.8 Preservation Of Alternatives

In this subtask, alternatives with the most favorable composite evaluation of all factors are retained for further consideration during detailed analysis. Alternatives selected will preserve the range of treatment and containment technologies initially developed plus the no action alternative.

10.1.9 Alternatives Array Document

The purpose of this subtask is to request the determination of possible applicable or relevant and appropriate requirements (ARARs) by concerned State and Federal agencies. A description of the screened alternatives retained (including extent of remediation, contaminant levels to be addressed, and methods of treatment) will be presented. This document will also include a brief site history and background, a site characterization summary that includes contaminants of concern, migration pathways, receptors, and other pertinent site information. This Alternatives Array Document will be submitted to the IEPA and U.S. EPA, along with the request for notification of the standards and requirements (ARARs). If

needed, a meeting will be scheduled between the IEPA, U.S. EPA, Respondents, and Warzyn to discuss the Alternatives Array Document and ARARs.

10.2 TASK 8 - DETAILED ANALYSIS OF REMEDIAL ALTERNATIVES

Section 121(b)(1)(A-G) of CERCLA outlines general rules for cleanup actions, and establishes the SARA statutory preference for permanent remedies, and for treatment and/or resource recovery technologies that reduce toxicity, mobility or volume of hazardous substances, pollutants and contaminants. Further, it directs that the long-term effectiveness of alternatives be specifically addressed and that at a minimum the following be considered in assessing alternatives:

A. Long-term uncertainties associated with land disposal;

B. Goals, objectives and requirements of the Solid Waste Disposal Act;

C. Persistence, toxicity, mobility and propensity to bioaccumulate of hazardous substances and their constituents;

D. Short- and long-term potential for adverse health effects from human exposure;

E. Long-term maintenance costs;

F. Potential for future remedial action costs if the alternative were to fail; and

G. Potential threat to human health and the environment associated with excavation, transportation and redisposal, or containment.

The U.S. EPA has developed nine evaluation criteria, discussed in Section 10.2.2. Consideration of the criteria is intended to satisfy the statutory requirements; i.e., points A through G above, and to enable the decision maker to compare alternatives and select a remedy which will:

- Be protective of human health and the environment,
- Attain applicable or relevant and appropriate requirements (ARARs), or provide grounds for invoking a waiver,
- Be cost effective,

- Use permanent solutions and alternative treatment technologies to the maximum extent practicable, and

- Satisfy the preference for treatment that reduces toxicity, mobility or volume as a principle element (or provide an explanation for why it does not).

The analysis of alternatives task is basically a three-stage process consisting of the following:

- Detailed definition of alternatives,
- Detailed analysis of alternatives, and
- Comparison of alternatives

10.2.1 Detailed Definition Of Alternatives

Each alternative will be defined in sufficient detail to facilitate subsequent evaluation and comparison. Typically this activity may involve modification of alternatives based on ARARs, refinement of quantity estimates, technology changes, or site areas to be addressed. Prior to detailed definition, the final conceptual alternatives will be agreed on by the Respondents, IEPA, U.S. EPA and Warzyn.

10.2.2 Detailed Analysis Of Alternatives

Alternatives will be evaluated with respect to nine criteria. The nine criteria encompass:

- technical, cost and institutional considerations,
- compliance with statutory and regulatory requirements, and
- state and community acceptance.

Each factor is briefly discussed below.

- Overall Protection The assessment against this criterion describes how the alternative as a whole achieves protection and will continue to protect human health and the environment.

- Compliance with ARARs The assessment against this criterion describes how the alternative complies with ARARs, or, if a waiver is required, how it is justified.

- Long-term Effectiveness and Permanence The assessment of alternatives against this criterion evaluates the long-term effectiveness of alternatives

in protecting human health and the environment after response objectives have been met.

- Reduction of Toxicity, Mobility and Volume The assessment against this criterion evaluates the anticipated performance of the specific treatment technologies.

- Short-term Effectiveness The assessment against this criterion examines the effectiveness of alternatives in protecting human health and the environment during the construction and implementation period until response objectives have been met.

- Implementability This assessment evaluates the technical and administrative feasibility of alternatives and the availability of required resources.

- Cost This assessment evaluates the capital and O&M costs of each alternative.

- State Acceptance This assessment reflects the State's (or supporting agency's) apparent preferences or concerns about alternatives.

- Community Acceptance This assessment reflects the community's apparent preferences or concerns about alternatives.

10.2.3 Comparison Of Alternatives

After each alternative has been analyzed against each of the criteria, a comparative analysis will be conducted. The purpose of this analysis is to compare the relative performance of alternatives with respect to each evaluation criterion. The narrative discussion will describe the strengths and weaknesses of the alternatives relative to one another with respect to each criterion, and how reasonable variations of key uncertainties could change the expectations of their relative performance. If innovative technologies are being considered, their potential advantages in cost or performance and the degree of uncertainty in their expected performance (as compared with more demonstrated technologies) will also be discussed. A table will be prepared summarizing the assessment of each alternative with respect to each of the nine criteria.

10.2.4 Detailed Analysis Of Alternatives - Report

A technical report detailing by subtask, the activities and results of Task 7 will be prepared and submitted in draft form to the IEPA and U.S. EPA for review and comment. The document will include a summary of the evaluation of alternatives.

Following receipt of comments, revisions will be made, as appropriate, and the document will be submitted in final form.

10.3 TASK 9 - FEASIBILITY STUDY REPORT

Feasibility Study activities and results will be described and documented in a report. A Feasibility Study report covering the activities and conclusions of Tasks 7 and 8 will be prepared and submitted in draft form to the IEPA and U.S. EPA for review and comment following approval of the technical memoranda.

A meeting will be scheduled to discuss IEPA and U.S. EPA comments, if any, prior to preparation of the Public Comment FS Report by Warzyn. The FS report will not be considered "final" until a letter of approval is issued by the IEPA and U.S. EPA RPM, after the public has had an opportunity to comment.

Certain FS activities will be initiated at the start of the RI and will be continued throughout the RI/FS process. These include:

- refining and documenting remedial action objectives and alternatives;
- developing general response actions;
- assessing the need for and implementing treatability studies; and
- identification of ARARs.

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11

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Site Investigation Activity Summary
Beloit Corporation Rockton Facility
Rockton, Illinois

Activity	Description	Results	Utilization of Data	Anticipated Number of Investigative Samples/Tests
SOURCE CHARACTERIZATION				
Electromagnetic/ Magnetometer Survey	Perform an electromagnetic/magnetometer survey to determine the presence of buried drums, or other metallic waste, and/or buried storage tanks at 1314 Watts Avenue and Soterion.	Site map showing magnetic anomalies.	Determine whether additional investigation of buried drums is necessary.	None
Soil Gas Survey	Perform soil gas survey at potential source areas within the RI/FS boundaries. Soil gases will be collected from shallow probes and analyzed with an in-field gas chromatograph for volatile organic compounds (VOCs).	Site map showing soil VOC concentrations.	Investigate for the potential retention of VOCs in the unsaturated zone. Identify contaminant source locations and determine locations for soil and groundwater quality borings	101 samples
Shallow Soil Borings and Soil Sampling	Perform twelve (12) shallow soil borings in potential source areas and collect soil samples for laboratory analysis. Surface soil samples will be collected at the twelve boring locations and at one background location. Samples will be analyzed for U.S. EPA Target Compound List (TCL) and Target Analyte List (TAL) parameters. Subsurface soil samples will be selected based on visual observations and photoionization detector (PID)/flame-ionization detector (FID) readings.	Soil boring logs describing subsurface conditions in potential contaminant source areas. Analytical laboratory results showing magnitude of source/soil contamination.	Evaluate source and subsurface soil contamination.	A minimum of 24 subsurface soil samples with at least one per boring. Actual number of samples dependent on in-field screening results.
			Surface soil assessment to determine the potential for direct contact exposure to contaminated surface soils.	12 surface soil samples. 1 background surface soil sample.
MIGRATION PATHWAY ASSESSMENT				
Hydrogeologic Investigation	Evaluate the integrity of existing wells constructed with stainless steel. Natural gamma log all new borings and several existing wells (natural gamma log deep well only at the location of a well nest).	Supplement subsurface geologic data, determine status and quality of existing wells at site.	Subsurface data for developing geologic cross-sections at the site.	None

Activity	Description	Results	Utilization of Data	Anticipated Number of Investigative Samples/Tests
	Twenty-two (22) borings will be drilled at 14 locations and 16 wells installed at 8 of these locations to further characterize site geology. Soil samples will be visually classified in the field and selected samples will be analyzed for grain size (sieve and hydrometer). Four of the 16 monitoring wells will be replacement wells for existing monitoring wells. One of the borings will be a geotechnical boring.	Soil boring logs, well construction details, water level data, hydraulic conductivity data and downhole geophysical logs.	Describe geologic strata with respect to potential contaminant migration. Determine groundwater flow directions and estimate rates.	20 soil samples for geotechnical testing, actual number to be determined in the field.
	Groundwater level measurements will be made at new and existing wells on four occasions.			4 Rounds Water Levels
	Single well hydraulic conductivity tests will be performed in new wells and existing functional wells based on results of the monitoring well evaluation.			14 Hydraulic Conductivity Tests (minimum)
	Five deep and two intermediate depth water quality borings will be drilled at seven of the 13 locations to characterize Site geology, assess water quality with depth, and identify possible preferred migration pathways at the site. Groundwater samples will be collected at 10 ft intervals and screened for total VOCs. Boreholes will be natural gamma logged to enhance and confirm soil stratigraphy. Monitoring wells may be installed based on field water quality screening results.	Soil boring logs, groundwater quality with depth data, downhole geophysical logs, groundwater samples.	Groundwater quality results will be used as screening data to locate the presence of VOCs beneath the site.	Minimum of 57 groundwater samples, the actual number will be determined in the field by GC screening results for VOCs.
Surface Water and Sediment Investigation	Surface water drainage patterns will be identified and mapped based on field observation. Three staff gauges will be installed in local surface water bodies.	Surface water level elevations. Map indicating surface water drainage.	Evaluate the potential for contaminant migration from the site by surface water/sediment route. Evaluate potential effects on groundwater flow patterns by bank storage.	4 Rounds of water levels

TABLE 1

Activity	Description	Results	Utilization of Data	Anticipated Number of Investigative Samples/Tests
Surface Soils Assessment	The potential for exposure to contaminants via the surface soils pathway will be evaluated based on analytical results from the twelve shallow soil borings. Portions of this study may overlap with the hydrologic study and source characterization. The potential for the transport of contaminated soil, both to the site from off-site sources, and off-site will be assessed. Field observations will be used to assess this pathway.	Description and characterization of site surface soils.	Evaluate the potential for exposure to contaminants via surface soils.	12 surface soil samples and 1 background surface soil sample collected during Source Characterization activities.
Air Assessment	Wind patterns will be evaluated based on available meteorological information to determine possible exposure scenarios. Air quality data collected for health and safety monitoring during site investigation activities will be evaluated to assess the potential for release of contaminants to air.	Description of meterological conditions.	Estimate potential for contaminant transport via air.	Health & Safety monitoring data during site investigation activity.
CONTAMINANT CHARACTERIZATION				
Groundwater Sampling	Round 1 groundwater sampling will consist of sampling the 16 new monitoring wells, 15 existing monitoring wells constructed with stainless steel and private wells. Samples will be analyzed for U.S. EPA CLP TCL/TAL parameters, and several indicator parameters. Round 2 groundwater sampling (Phase 2) will consist of sampling wells for contaminants of concern identified during Round 1.	Groundwater level data, concentrations of contaminants in groundwater.	Round 1 to confirm contaminants of concern in groundwater. Round 2 to determine magnitude and extent of groundwater contamination for RI report. Supply data for Risk Assessment and Feasibility Study.	31 total groundwater samples, including 16 new monitoring well samples, and 15 existing monitoring well samples.

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TABLE 2

Monitoring Well And Deep And
Intermediate Boring Locations And Rationale
Beloit Corporation Rockton Facility RI/FS
Rockton, Illinois

Well Number	Approximate Depth	Approximate Location (2)	Rationale
W19 W19B	35 60	500 FT SOUTH OF FIBROUS SLUDGE AREA	TO EXAMINE WATER QUALITY DOWNGRADIENT FROM THE SITE
W20 W20B	35 60	250 FT SOUTH OF FOUNDRY SAND DISPOSAL AREA	TO EXAMINE WATER QUALITY DOWNGRADIENT OF THE FOUNDRY SAND DISPOSAL AREA
W21 W21B	35 60	25 FT EAST OF FOUNDRY SAND DISPOSAL AREA	TO EXAMINE WATER QUALITY SIDEGRADIENT OF THE FOUNDRY SAND AREA
W22 W22B W22C	35 60 80	800 FT SOUTH OF PLANT	EXAMINE WATER QUALITY SOUTH OF THE PLANT AND VARIATIONS WITH DEPTH AT THE SITE
W23 W23B	35 (1)	50 FT SOUTHWEST OF PLANT	TO EXAMINE WATER QUALITY NEAR THE PLANT AND WITH DEPTH
W24	30	~500 FT NORTH OF PRAIRIE HILL RD	DETERMINE UPGRADIENT WATER QUALITY
W3	35	ADJACENT TO PREVIOUS LOCATION	REPLACEMENT
W5	60	ADJACENT TO PREVIOUS LOCATION	REPLACEMENT
W8	35	ADJACENT TO PREVIOUS LOCATION	REPLACEMENT AND TO EVALUATE BACKGROUND WATER QUALITY
W11	60	ADJACENT TO PREVIOUS LOCATION	REPLACEMENT AND TO EVALUATE BACKGROUND WATER QUALITY

TABLE 2
(Continued)

Well Number	Approximate Depth	Approximate Location (2)	Rationale
DEEP BORINGS			
DB1	(1)	NEAR W3/W5 WELL NEST	TO EXAMINE WATER QUALITY WITH DEPTH
DB2	(1)	BETWEEN W12 AND W2	TO EXAMINE WATER QUALITY WITH DEPTH
DB3	(1)	SOUTH END OF WATTS AVE.	TO EXAMINE WATER QUALITY WITH DEPTH
DB4	(1)	SOUTH CORNER OF PROPERTY	TO EXAMINE WATER QUALITY WITH DEPTH
IB1	(1)	1314 WATTS AVE.	TO EXAMINE WATER QUALITY WITH DEPTH
GB1	(3)	LOCATION OF EXISTING STAND PIPE SP11	TO GROUND TRUTH NATURAL GAMMA LOGGER AND COMPARE BOREHOLE STRATIGRAPHIC DESCRIPTIONS

FOOT NOTES:

(1) Determined by in-field gas chromatograph results of groundwater samples.
- minimum depth for intermediate borings = 70 ft
- minimum depth for deep borings = 100 ft

(2) See Drawing 15268-7 for approximate boring and well locations.

(3) Depth is dependent on total depth reached by any one Deep or Intermediate Groundwater Quality Boring.

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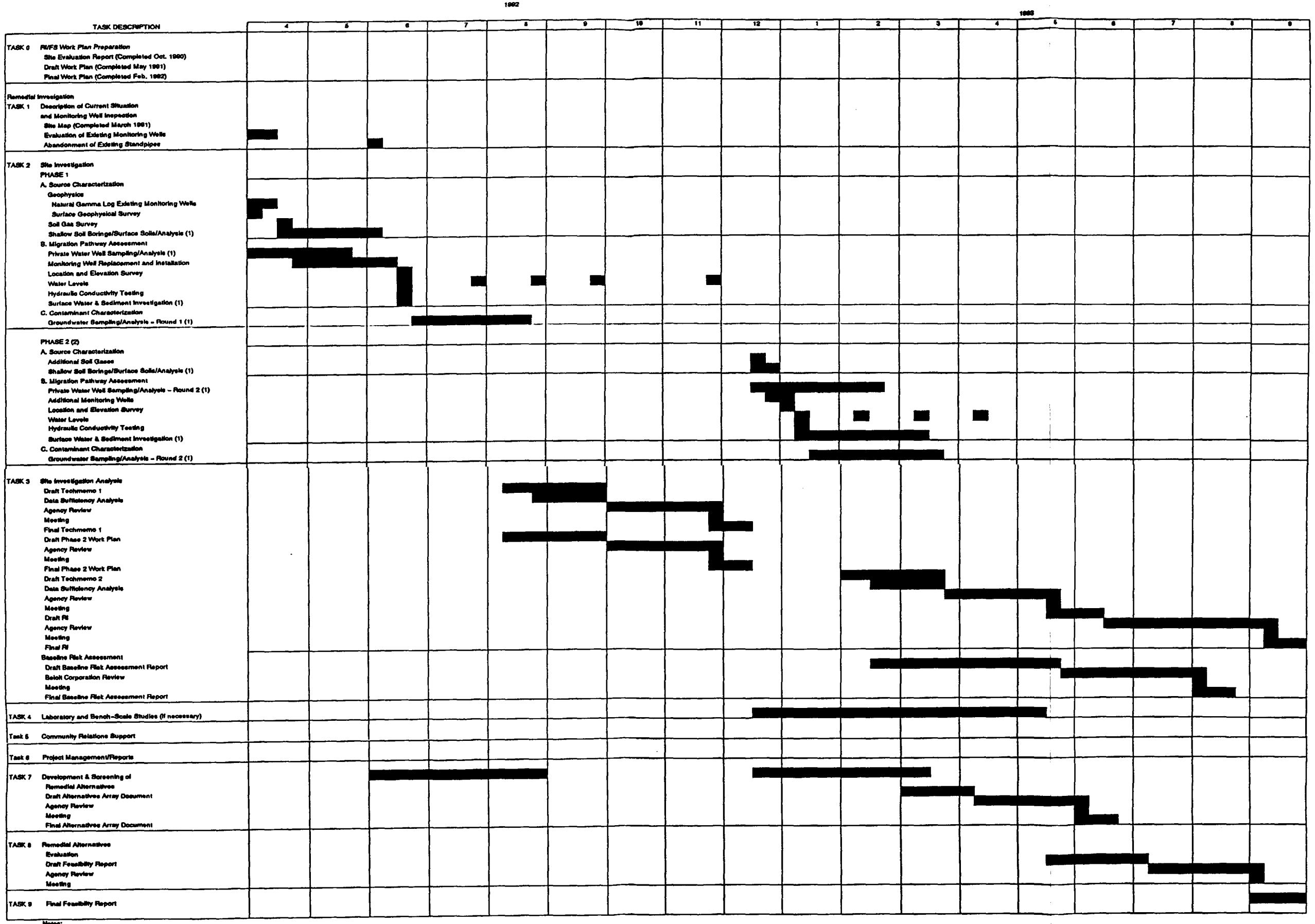
FIGURE 1

PROPOSED PROJECT SCHEDULE
BELOIT CORPORATION RI/FS

YEARS/MONTHS



Notes:

(1) Analytical turnaround time is estimated to be 35 working days.

(2) Phase 2 activities are subject to change based on Phase 1 results, proposed activities and IEPA/U.S. EPA approval. Phase 2 investigation activities may include none, some, or all of the listed activities.

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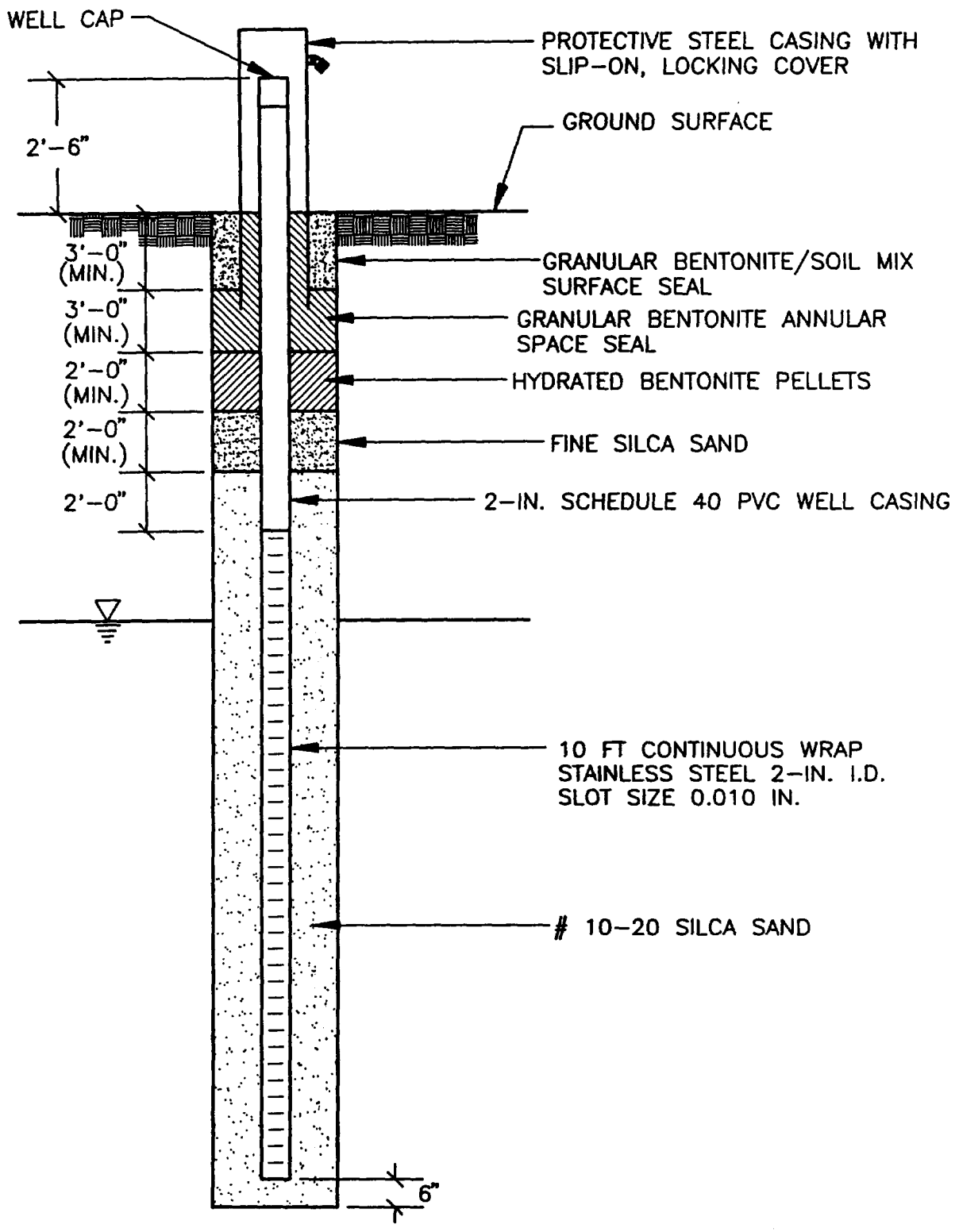
[15268\FIGURE1/mod]

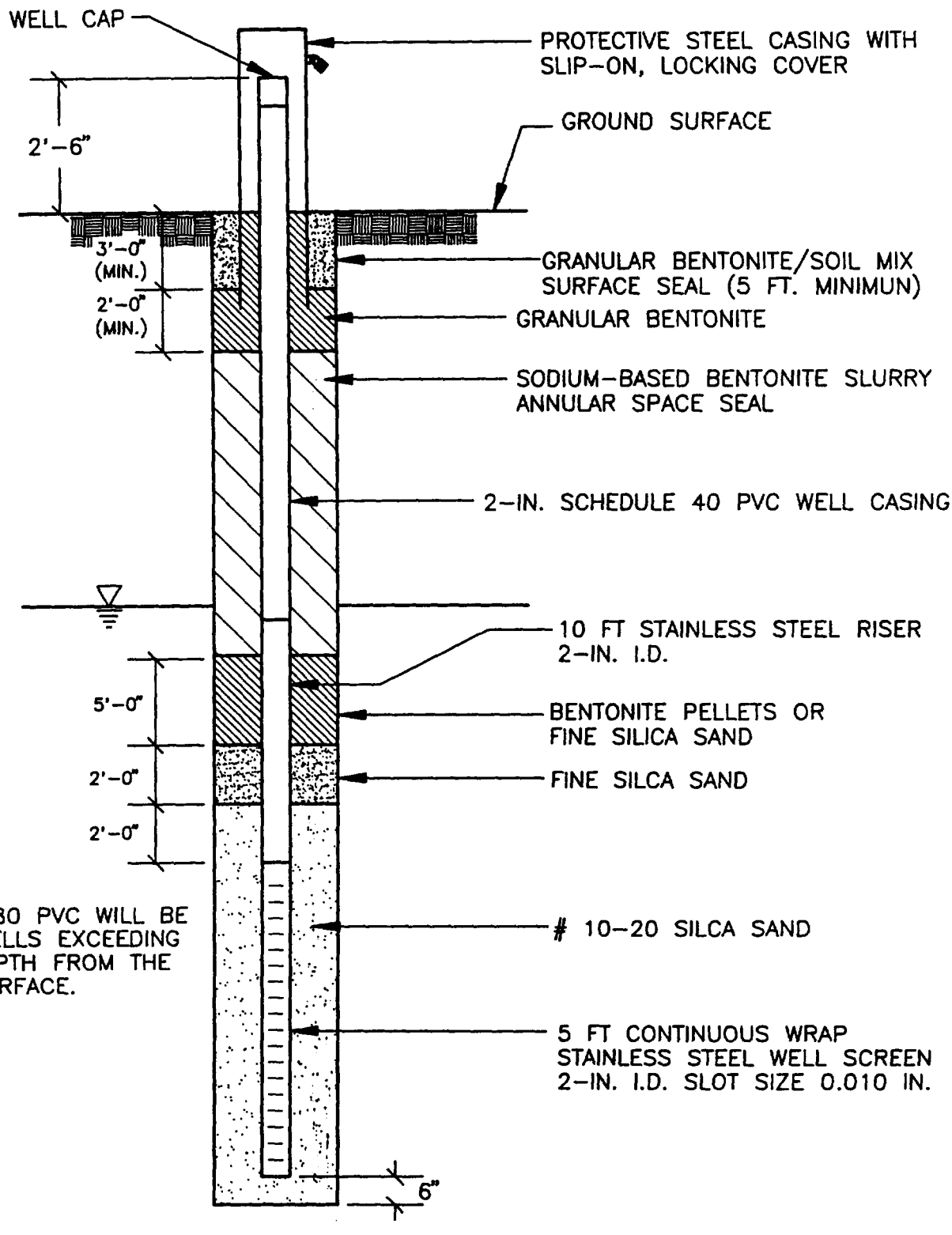


NOT TO SCALE

QUALITY CONTROL
Graphic Standards ULR 2/19/91
Lead Professional TJK 2/20/91
Technical Review TEM 2/28/91
Project Manager KJD 3/5/91
Management Review DW. 3/5/91
Other

Developed By:	Drawn By: RJW	**WATER TABLE WELL**	Drawing Number 15268 A7
Approved By: KJD	Date: 5-31-91	BELOIT CORPORATION ROCKTON FACILITY REMEDIAL INVESTIGATION/ FEASIBILITY STUDY TOWN OF ROCKTON WINNEBAGO COUNTY. ILLINOIS	WARZYN
Reference:			
Revisions:			

WARZYN INC.



NOTES:

1. SCHEDULE 80 PVC WILL BE USED IN WELLS EXCEEDING 80FT IN DEPTH FROM THE GROUND SURFACE.

NOT TO SCALE

QUALITY CONTROL
Graphic Standards DLF 2/19/91
Lead Professional TJK 2/20/91
Technical Review TEM 2/28/91
Project Manager KJD 3/5/91
Management Review DWn 3/5/91
Other

Developed By:	Drawn By: RJW	**PIEZOMETER (DEEP) WELL**	Drawing Number 15268 **A8**
Approved By: KJD	Date: 5-31-91	BELOIT CORPORATION ROCKTON FACILITY REMEDIAL INVESTIGATION/ FEASIBILITY STUDY TOWN OF ROCKTON WINNEBAGO COUNTY. ILLINOIS	WARZYN
Reference:			
Revisions:			

WARZYN INC.

A

Data Management Plan

TABLE OF CONTENTS

[mad-603-12a]

1

INTRODUCTION

This Data Management Plan describes the program for management of data and information collected during the Beloit Corporation RI/FS. The plan outlines the procedures to maintain the quality and integrity of the data that are collected and discusses the disposition of the data collected during the RI/FS tasks and special data handling procedures. Specific data documentation protocols are detailed in the Quality Assurance Project Plan (QAPP).

2

DATA TYPES

Two data types are associated with the investigation. The first is technical data that are required for or generated by specific investigative tasks. These data include: field data, data resulting from subsequent laboratory or engineering analyses, background research data and documents, and state of practice technical data and documents.

The second data type includes information associated with monitoring, managing and documenting the actual performance of the RI/FS tasks. Specific data management protocols to be followed for both types of information are discussed in the following sections.

3

DATA MANAGEMENT

Specific data management procedures are discussed in the QAPP, Sections 5 and 9, and in the following sections. These sections discuss the fundamental data

handling elements and are subject to change based on possible changes in the investigative tasks.

Field Measurements and Observations

Field observations and measurements will be recorded in a project logbook and on field record forms. Information concerning field activities and conditions will be recorded directly and legibly in the field logbooks and on field forms, and entries will be signed and dated. If an entry must be changed, the change will not obscure the original entry, and the reason for the change will be stated. The change and the explanation will be signed and dated. The logbook will document the date, weather conditions, site activities, and personnel on site, including visitors. Field data records will be organized into standard form formats and retained in locked permanent files.

Sample Identification and Chain-of-Custody

Field samples will be identified by sample tags and labels. The information on the sample tag will include the date and time the sample was collected, the sampling location, the name of the sample collector, and any pertinent remarks. Copies of the sample tags will be stored in a permanent locked file. Details of the sample labeling are provided in the Field Sampling Plan.

Chain-of-Custody Procedures

The chain-of-custody procedures for this project are found in detail in the QAPP, Section 5, and discussed briefly here. Prior to delivery of samples to the laboratory, a chain-of-custody form will be prepared identical to the labels and tags secured on the sample jars noting sample identification, date and time of sample collection, number of samples being submitted to the laboratory and the signature of the field personnel collecting the samples. Chain-of-custody forms will be completed in duplicate using carbonless duplicate forms. The original custody form will be taped to the inside lid of the shipping cooler and a duplicate will be maintained for the project files. The shipping cooler will be secured with strapping tape and custody seals will be placed across the cooler opening to maintain sample integrity during shipment.

Laboratory Documentation

Laboratory records will document sample receipt dates, laboratory analysis dates, and report dates. After quality assurance review, the results will be transmitted to the RI/FS consultant.

Document Control, Inventory, and Filing Systems

The data storage and information system established for the project will address the receipt of data, screening and validating of data to identify and reject outliers or errors, and preparation, sorting and entering of data into data storage files. A

quality assurance/quality control form will be completed by the internal reviewer that indicates QA/QC activities were used to review the information and describe the precision and accuracy of the analysis. The internal reviewer will then make the data available to the data users. Data originals will be secured in locked files. Copies of original data will be maintained only by those personnel who are using the data during the analysis procedures and that which is stored for computer manipulation.

The Project Manager will be responsible for maintaining the document control system during the investigation. The document inventory and filing system will be based on serially numbered documents. Documents will be given a number and a description of the document and number will be maintained in the file.

Much of the data collected during the remedial investigation will be stored in a computer data base file system. The storage system is based on a VAX mini computer system that has an established backup system to preserve data security and integrity. After keying in the data, a report of data will be obtained and the internal reviewer will check against the field reports to check that the data has been entered correctly. The stored data are then capable of being organized into reports and lists, analyzed statistically, or transferred to design/drafting hardware. There are established file protections so that only designated personnel are allowed access to the data files. At the completion of the database utility, the data files will be closed. The data files can be archived for an undetermined amount of time or completely destroyed. The backup files created during storage will be destroyed in six months.

Other data recording methods during management procedures associated with specific RI/FS sampling activities are discussed in the Field Sampling Plan, and also in the QAPP.

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